IN THE CLAIMS:

Please cancel Claims 1, 5, 13 and 17 without prejudice or disclaimer of subject matter, amend Claims 2 to 4, 8, 11, 14 to 16, 19, 21 and 22 and add new Claims 86 to 91 as shown below. The claims, as pending in the subject application, now read as follows:

1. (Canceled)

2. (Currently amended) A decoding method of decoding encoded image data which has been hierarchically encoded in advance by a discrete wavelet transform method, comprising:

determining a size of an image to be output;

judging a minimum number of layer/layers of hierarchy needed to obtain a decoded image of size equal to or exceed the determined size;

determining whether the minimum number of layer/layers of hierarchy corresponds to all the layers of hierarchy of the encoded image data;

decoding, if the determination proves true, all the layers of hierarchy of the encoded image data, and otherwise decoding the encoded image data up to a layer of hierarchy which is one or more layers higher than the minimum number of layer/layers of hierarchy; and

reducing the size of the decoded image to the determined size~~The decoding method according to claim 1~~,

wherein , in said judging step, the number n ~~which~~ satisfies a condition of

$$1/2^n \geq \text{Sout/Sin} > 1/2^{(n+1)}$$

where Sout is an output image size, and Sin is the input image size, n is an integer equal to or greater than 1, and is judged as the minimum number of layer/layers of hierarchy, and

in said decoding step, image data is decoded up to a hierarchy until an input-output ratio of image size becomes

$$1/2^{(n-1)}.$$

3. (Currently amended) A decoding method of decoding encoded image data which has been hierarchically encoded in advance by a discrete wavelet transform method, comprising:

determining a size of an image to be outputted;

judging a minimum number of layer/layers of hierarchy needed to obtain a decoded image of size equal to or exceed the determined size;

determining whether the minimum number of layer/layers of hierarchy corresponds to all the layers of hierarchy of the encoded image data;

decoding, if the determination proves true, all the layers of hierarchy of the encoded image data, and otherwise decoding the encoded image data up to a layer of hierarchy which is one or more layers higher than the minimum number of layer/layers of hierarchy; and

reducing the size of the decoded image to the determined size~~The decoding method according to claim 1~~,

wherein, in said judging step, the number n ~~which~~ satisfies a condition of

$$X = Sin/Sout$$

$$n = INT(\log_2 X)$$

where Sout is an output image size, and Sin is the input image size ~~seize~~, and is judged as the minimum number of layer/layers of hierarchy; and

in said decoding step, image data is decoded up to a hierarchy which satisfies a condition of

Number of Layer/Layers to Be Decoded = (Total Number of Layers) - n + 1.

4. (Currently amended) A decoding method of decoding encoded image data which has been hierarchically encoded in advance by a discrete wavelet transform method, comprising:

determining a size of an image to be outputted;

judging a minimum number of layer/layers of hierarchy needed to obtain a decoded image of size equal to or exceed the determined size;

determining whether the minimum number of layer/layers of hierarchy corresponds to all the layers of hierarchy of the encoded image data;

decoding, if the determination proves true, all the layers of hierarchy of the encoded image data, and otherwise decoding the encoded image data up to a layer of hierarchy which is one or more layers higher than the minimum number of layer/layers of hierarchy; and

reducing the size of the decoded image to the determined size~~The decoding method according to claim 1~~,

wherein said decoding includes:

decoding a lowest layer of hierarchy of encoded image data among layer/layers which has/have not been decoded, comparing a size of an image obtained by decoding the encoded image data and the determined size, and repeating the decoding of a lowest layer of hierarchy of the encoded image data among the layer/layers which has/have not been decoded when the size of the decoded image is smaller than the determined size; and

decoding a next lowest layer of hierarchy of the encoded image data when the size of the decoded image becomes not smaller than the determined size for a first time.

5. to 7. (Canceled)

8. (Currently amended) The decoding method according to claim 2 [[1]], wherein the determined size includes horizontal pixel number information and vertical pixel number information.

9. (Canceled)

10. (Currently amended) The decoding method according to claim 2[[1]], wherein an encoding method used conforms to JPEG2000.

11. (Currently amended) A decoding apparatus for decoding encoded image data which has been hierarchically encoded in advance, comprising:

a first determination unit that determines a size of an image to be outputted;

a judging unit that judges a minimum number of layer/layers of hierarchy needed to obtain a decoded image of size equal to or exceed the determined size;

a second determination unit that determines whether the minimum number of layer/layers of hierarchy corresponds to all the layers of hierarchy of the encoded image data;

a decoding unit that, if the determination proves true, encodes all the layers of hierarchy of the enclosed image data, and otherwise decodes the encoded image data up to a layer of hierarchy which is one or more layers higher than the minimum number of layer/layers of hierarchy; and

a reduction unit that reduces the size of the decoded image to the determined size,

wherein, in said judging step, the number n satisfies a condition of

$$1/2^{n} \geq Sout/Sin > 1/2^{(n+1)}$$

where Sout is an output image size, and Sin is the input image size, n is an integer equal to or greater than 1, and is judged as the minimum number of layer/layers of hierarchy, and

wherein, in said decoding step, image data is decoded up to a hierarchy until an input-output ratio of image size becomes

$$1/2^{(n-1)}.$$

12. and 13. (Canceled)

14. (Currently amended) A decoding method of decoding encoded image data which has been hierarchically encoded in advance by a discrete wavelet transform method, comprising:

determining a size of an image to be outputted;

judging a minimum number of layer/layers of hierarchy needed to obtain a decoded image of size equal to or exceed the determined size;

determining whether the minimum number of layer/layers of hierarchy corresponds to all the layers of hierarchy of the encoded image data;

decoding, if the determination proves true, all the layers of hierarchy of the encoded image data, and otherwise decoding the encoded image data up to a layer of hierarchy which is one or more layers higher than the minimum number of layer/layers of hierarchy; and

reducing the size of the decoded image to the determined size~~The encoding method according to claim 13~~,

wherein, in said judging step, the number n ~~which~~ satisfies a condition of

$$1/2^n \geq Sout/Sin > 1/2^{(n+1)}$$

where Sout is an output image size, and Sin is the input image size, n is an integer equal to or greater than 1, and is judged as the minimum number of layer/layers of hierarchy,[[;]] and

wherein, in said encoding step, image data is decoded up to a hierarchy until an input-output ratio of image size becomes

$$1/2^{(n+1)}.$$

15. (Currently amended) A decoding method of decoding encoded image data which has been hierarchically encoded in advance by a discrete wavelet transform method, comprising:

determining a size of an image to be outputted;

judging a minimum number of layer/layers of hierarchy needed to obtain a decoded image of size equal to or exceed the determined size;

determining whether the minimum number of layer/layers of hierarchy corresponds to all the layers of hierarchy of the encoded image data;

decoding, if the determination proves true, all the layers of hierarchy of the encoded image data, and otherwise decoding the encoded image data up to a layer of hierarchy which is one or more layers higher than the minimum number of layer/layers of hierarchy; and

reducing the size of the decoded image to the determined size~~The encoding method according to claim 13~~,

wherein, in said judging step, the number n ~~which~~ satisfies a condition of

$$X = Sin/Sout$$

$$n = INT(\log_2 X)$$

where Sout is an output image size, and Sin is the input image size~~ seize~~, and is judged as the minimum number of layer/layers of hierarchy,[[;]] and

wherein, in said encoding step, image data is encoded up to a hierarchy which satisfies a condition of

Number of Layer/Layers to Be Decoded = (Total Number of Layers) - n + 1.

16. (Currently amended) A decoding method of decoding encoded image data which has been hierarchically encoded in advance by a discrete wavelet transform method, comprising:

determining a size of an image to be outputted;

judging a minimum number of layer/layers of hierarchy needed to obtain a decoded image of size equal to or exceed the determined size;

determining whether the minimum number of layer/layers of hierarchy corresponds to all the layers of hierarchy of the encoded image data;

decoding, if the determination proves true, all the layers of hierarchy of the encoded image data, and otherwise decoding the encoded image data up to a layer of hierarchy which is one or more layers higher than the minimum number of layer/layers of hierarchy; and

reducing the size of the decoded image to the determined size~~The encoding method according to claim 13~~,

wherein said encoding includes:

encoding a lowest layer of hierarchy of an image among layer/layers which has/have not been encoded, comparing a size of an encoded image and the determined size, and repeating encoding of a lowest layer of hierarchy of the image among the layer/layers which has/have not decoded when the size of the encoded image is smaller than the determined size; and

encoding a next lowest layer of hierarchy of the image when the size of the encoded image becomes not smaller than the determined size for a first time.

17. and 18. (Canceled)

19. (Currently amended) The encoding method according to claim 14 [[13]], wherein the determined size includes horizontal pixel number information and vertical pixel number information.

20. (Canceled)

21. (Currently amended) The encoding method according to claim 14 [[13]], wherein an encoding method conforms to JPEG2000.

22. (Currently amended) An encoding apparatus for hierarchically encoding an image, comprising:

a first determination unit that determines a size of an image to be outputted;

a judging unit that judges a minimum number of layer/layers of hierarchy needed to obtain a decoded image of size equal to or exceed the determined size;

a second determination unit that determines whether the minimum number of layer/layers of hierarchy corresponds to all the layers of hierarchy to which the image data can be encoded; [[and]]

an encoding unit that, if the determination proves true, encodes all the layers of hierarchy of the image data, and otherwise encodes the image up to a layer of hierarchy which is one or more layers higher than the minimum number of layer/layers of hierarchy; and

reducing the size of the decoded image to the determined size,

wherein, in said judging step, the number n satisfies a condition of

$$1/2^n \geq Sout/Sin > 1/2^{(n+1)}$$

where Sout is an output image size, and Sin is the input image size, n is an integer equal to or greater than 1, and is judged as the minimum number of layer/layers of hierarchy, and

wherein, in said encoding step, image data is decoded up to a hierarchy until an input-output ratio of image size becomes

$$1/2^{(n+1)}.$$

23. (Canceled)

24. (Withdrawn) An encoding method of hierarchically encoding an image by a discrete wavelet transform method or by using an orthogonal mirror filter, comprising:

restraining a frequency component which causes alias of an image signal of the image in advance of separating the image signal into layers of hierarchy; and

separating the restrained image signal into layers of hierarchy using a hierarchy separation filter.

25. (Withdrawn) The encoding method according to claim 24, wherein said restraining includes:

restraining a high frequency component of the input image signal; and

restraining a low frequency component of the input image signal.

26. (Withdrawn) The encoding method according to claim 25, wherein a low pass filter is used in said restraining of the high frequency component, and an output from said low pass filter is subtracted from the input image signal in said restraining of the low frequency component.

27. (Withdrawn) The encoding method according to claim 25, wherein a high pass filter is used in said restraining of the low frequency component, and an output from the high pass filter is subtracted from the input image signal in said restraining of the high frequency component.

28. (Withdrawn) The encoding method according to claim 25, wherein a low pass filter is used in said restraining of the high frequency component, and a high pass filter is used in said restraining of the low frequency component.

29. (Withdrawn) The encoding method according to claim 25, repeating said restraining and said separating for an image signal obtained by separating the image signal whose high frequency component is restrained.

30. (Withdrawn) The encoding method according to claim 26, wherein a filter is used in said separating, and a passband of the low pass filter is narrower than a passband of the filter used in said separating.

31. (Withdrawn) The encoding method according to claim 28, wherein a filter is used in said separating, and a passband of the low pass filter is narrower than a passband of the filter used in said separating.

32. (Withdrawn) The encoding method according to claim 27, wherein a filter is used in said separating, and a passband of the high pass filter is narrower than a passband of the filter used in said separating.

33. (Withdrawn) The encoding method according to claim 28, wherein a filter is used in said separating, and a passband of the high pass filter is narrower than a passband of the filter used in said separating.

34. (Withdrawn) The encoding method according to claim 25, wherein in said restraining of a high frequency component and a low frequency component, at least either one of a horizontal component and a vertical component of the image signal is restrained.

35. and 36. (Canceled)

37. (Withdrawn) The encoding method according to claim 24, wherein an encoding method conforms to JPEG2000.

38. (Withdrawn) An encoding apparatus for hierarchically encoding an image by a discrete wavelet transform method or by using an orthogonal mirror filter, comprising:

a frequency restraining unit that restrains a frequency component which causes alias of an image signal of the image in advance of separating the image signal into layers of hierarchy; and

a separating unit that separates the image signal restrained by said frequency restraining unit into layers of hierarchy using a hierarchy separation filter.

39. (Withdrawn) The encoding apparatus according to claim 38, wherein said frequency restraining unit comprises:

a first restraining unit which restrains a high frequency component of the input image signal; and

a second restraining unit that restrains a low frequency component of the input image signal.

40. (Withdrawn) The encoding apparatus according to claim 39, wherein said first restraining unit is a low pass filter, and said second restraining unit is a subtractor which subtracts the image signal restrained by said first restraining unit from the input image signal.

41. (Withdrawn) The encoding apparatus according to claim 39, wherein said second restraining unit is a high pass filter, and said first restraining unit is a subtractor

which subtracts the image signal restrained by said second restraining unit from the input image signal.

42. (Withdrawn) The encoding apparatus according to claim 39, wherein said first restraining unit is a low pass filter, and said second restraining unit is a high pass filter.

43. (Withdrawn) The encoding apparatus according to claim 39, wherein said frequency restraining unit and said separating unit recursively perform processes on an image signal obtained by separating by said separating unit the image signal restrained by said first restraining unit.

44. (Withdrawn) The encoding apparatus according to claim 40, wherein said separating unit includes a filter, and a passband of the low pass filter is narrower than the passband of the filter of the separating unit.

45. (Withdrawn) The encoding apparatus according to claim 42, wherein said separating unit includes a filter, and a passband of the low pass filter is narrower than the passband of the filter of the separating unit.

46. (Withdrawn) The encoding apparatus according to claim 41, wherein said separating unit includes a filter, and a passband of the high pass filter is narrower than the passband of the filter of the separating unit.

47. (Withdrawn) The encoding apparatus according to claim 41, wherein said separating unit includes a filter, and a passband of the high pass filter is narrower than the passband of the filter of the separating unit.

48. (Withdrawn) The encoding method according to claim 39, wherein said first and second restraining unit restrain at least either one of a horizontal component and a vertical component of the image.

49. and 50. (Canceled)

51. (Withdrawn) The encoding apparatus according to claim 38, wherein an encoding method conforms to JPEG2000.

52. (Withdrawn) A storage medium, readable by an information processing apparatus, storing a program including program codes capable of realizing the encoding method according to claim 24, the program being executable by the information processing apparatus.

53. (Withdrawn) A decoding method of decoding encoded image data which has been hierarchically encoded in advance by a discrete wavelet transform method, comprising:

determining a layer of hierarchy up to which the encoded image data is to be decoded;

decoding the encoded image data up to the determined layer;

judging whether or not the determined layer corresponds to the highest layer of hierarchy of the encoded image data; and

restraining, when the determined layer does not correspond to the highest layer, a frequency component, which corresponds to alias occurred by separating the image data into layers of hierarchy alias, of the decoded image data.

54. (Withdrawn) A decoding method of decoding encoded image data which has been hierarchically encoded in advance by a discrete wavelet transform method, comprising:

decoding all of the encoded image data;

judging whether or not the encoded image data was obtained as a result of encoding all layers of hierarchy; and

restraining, when all the layers of hierarchy have not been encoded, a frequency component, which corresponds to alias occurred by separating the image data into layers of hierarchy, of the decoded image data.

55. (Withdrawn) A decoding method of decoding encoded image data which has been hierarchically encoded in advance by a discrete wavelet transform method, comprising:

inputting encoded image data from external;

determining a layer of hierarchy up to which the encoded image data is to be decoded;

decoding the encoded image data up to the determined layer;

judging whether or not all layers of hierarchy of the encoded image data have been decoded; and

restraining, when all the layers of hierarchy have not been decoded, a frequency component, which corresponds to alias occurred by separating the image data into layers of hierarchy, of the decoded image data.

56. (Withdrawn) The decoding method according to claim 53, wherein a low pass filter is used in said restraining.

57. (Withdrawn) The decoding method according to claim 54, wherein a low pass filter is used in said restraining.

58. (Withdrawn) The decoding method according to claim 55, wherein a low pass filter is used in said restraining.

59. (Withdrawn) The decoding method according to claim 53, wherein in said restraining, at least a horizontal component or a vertical component is restrained.

60. (Withdrawn) The decoding method according to claim 54, wherein in said restraining, at least a horizontal component or a vertical component is restrained.

61. (Withdrawn) The decoding method according to claim 55, wherein in said restraining, at least a horizontal component or a vertical component is restrained.

62. to 64. (Canceled)

65. (Withdrawn) The decoding method according to claim 53, wherein an encoding method conforms to JPEG2000.

66. (Withdrawn) The decoding method according to claim 54, wherein an encoding method conforms to JPEG2000.

67. (Withdrawn) The decoding method according to claim 55, wherein an encoding method conforms to JPEG2000.

68. (Withdrawn) A decoding apparatus for decoding encoded image data which has been hierarchically encoded in advance by a discrete wavelet transform method, comprising:

a determination unit that determines a layer of hierarchy up to which the encoded image data is to be decoded;

a decoder which decodes the encoded image data up to the determined layer;

a judging unit that judges whether or not the determined layer corresponds to the highest layer of hierarchy of the encoded image data; and

a restraining unit that restrains, when the determined hierarchy does not corresponds to the highest layer, a frequency component, which corresponds to alias occurred by separating the image data into layers of hierarchy, of the decoded image data.

69. (Withdrawn) A decoding apparatus for decoding encoded image data which has been hierarchically encoded in advance by a discrete wavelet transform method, comprising:

a decoder that decodes all of the encoded image data;

a judging unit which judges whether or not the encoded image data was obtained as a result of encoding all layers of hierarchy; and

a restraining unit that restrains, when all the layers of hierarchy have not been encoded, a frequency component, which corresponds to alias occurred by separating the image data into layers of hierarchy, of the decoded image data.

70. (Withdrawn) A decoding apparatus for decoding encoded image data which has been hierarchically encoded in advance by a discrete wavelet transform method, comprising:

an input unit that inputs encoded image data from external;

a determination unit that determines a layer of hierarchy up to which the encoded image data is to be decoded;

a decoder that decodes the encoded image data up to the determined layer;

a judging unit that judges whether or not all layers of hierarchy of the encoded image data have been decoded; and

a restraining unit that restrains, when all the layers of hierarchy have not been decoded, a frequency component, which corresponds to alias occurred by separating the image data into layers of hierarchy, of the decoded image data.

71. (Withdrawn) The decoding apparatus according to claim 68, wherein said restraining unit uses a low pass filter.

72. (Withdrawn) The decoding apparatus according to claim 69, wherein said restraining unit uses a low pass filter.

73. (Withdrawn) The decoding apparatus according to claim 70, wherein said restraining unit uses a low pass filter.

74. (Withdrawn) The decoding apparatus according to claim 68, wherein said restraining unit restrains at least a horizontal component or a vertical component.

75. (Withdrawn) The decoding apparatus according to claim 69, wherein said restraining unit restrains at least a horizontal component or a vertical component.

76. (Withdrawn) The decoding apparatus according to claim 70, wherein said restraining unit restrains at least a horizontal component or a vertical component.

77. to 79. (Canceled)

80. (Withdrawn) The decoding apparatus according to claim 68, wherein an encoding method conforms to JPEG2000.

81. (Withdrawn) The decoding apparatus according to claim 69, wherein an encoding method conforms to JPEG2000.

82. (Withdrawn) The decoding apparatus according to claim 70, wherein an encoding method conforms to JPEG2000.

83. (Withdrawn) A storage medium, readable by an information processing apparatus, storing a program including program codes capable of realizing the decoding method according to claim 53, the program being executable by the information processing apparatus.

84. (Withdrawn) A storage medium, readable by an information processing apparatus, storing a program including program codes capable of realizing the decoding method according to claim 54, the program being executable by the information processing apparatus.

85. (Withdrawn) A storage medium, readable by an information processing apparatus, storing a program including program codes capable of realizing the decoding method according to claim 55, the program being executable by the information processing apparatus.

86. (New) The decoding method according to claim 3, wherein the determined size includes horizontal pixel number information and vertical pixel number information.

87. (New) The decoding method according to claim 4, wherein the determined size includes horizontal pixel number information and vertical pixel number information.

88. (New) A decoding apparatus for decoding encoded image data which has been hierarchically encoded in advance, comprising:

a first determination unit that determines a size of an image to be outputted;

a judging unit that judges a minimum number of layer/layers of hierarchy needed to obtain a decoded image of size equal to or exceed the determined size;

a second determination unit that determines whether the minimum number of layer/layers of hierarchy corresponds to all the layers of hierarchy of the encoded image data;

a decoding that, if the determination proves true, encodes all the layers of hierarchy of the encoded image data, and otherwise decoding the encoded image data up to a layer of hierarchy which is one or more layers higher than the minimum number of layer/layers of hierarchy; and

a reducing unit that reduces the size of the decoded image to the determined size,

wherein, in said judging unit, the number n satisfies a condition of

$$X = Sin/Sout$$

$$n = INT(\log_2 X)$$

where Sout is an output image size, and Sin is the input image size, and is judged as the minimum number of layer/layers of hierarchy; and

in said decoding unit, image data is decoded up to a hierarchy which satisfies a condition of

Number of Layer/Layers to Be Decoded = (Total Number of Layers) - n + 1.

89. (New) A decoding apparatus for decoding encoded image data which has been hierarchically encoded in advance, comprising:

a first determining unit that determines a size of an image to be outputted;

a judging unit that judges a minimum number of layer/layers of hierarchy needed to obtain a decoded image of size equal to or exceed the determined size;

a second determining unit that determines whether the minimum number of layer/layers of hierarchy corresponds to all the layers of hierarchy of the encoded image data;

a decoding unit that, if the determination proves true, all the layers of hierarchy of the encoded image data, and otherwise decoding the encoded image data up to a layer of hierarchy which is one or more layers higher than the minimum number of layer/layers of hierarchy; and

a reducing unit that reduces the size of the decoded image to the determined size,

wherein said decoding unit decodes:

a lowest layer of hierarchy of encoded image data among layer/layers which has/have not been decoded, comparing a size of an image obtained by decoding the encoded image data and the determined size, and repeating the decoding of a lowest layer of hierarchy of the encoded image data among the layer/layers which has/have not been decoded when the size of the decoded image is smaller than the determined size; and

a next lowest layer of hierarchy of the encoded image data when the size of the decoded image becomes not smaller than the determined size for a first time.

90. (New) A decoding apparatus for decoding encoded image data which has been hierarchically encoded in advance, comprising:

a first determining unit that determines a size of an image to be outputted;

a judging unit that judges a minimum number of layer/layers of hierarchy needed to obtain a decoded image of size equal to or exceed the determined size;

a second determining unit that determines whether the minimum number of layer/layers of hierarchy corresponds to all the layers of hierarchy of the encoded image data;

a decoding unit that, if the determination proves true, determines all the layers of hierarchy of the encoded image data, and otherwise decoding the encoded image data up to a layer of hierarchy which is one or more layers higher than the minimum number of layer/layers of hierarchy; and

a reducing unit that reduces the size of the decoded image to the determined size,

wherein, in said judging unit, the number n satisfies a condition of

$$X = Sin/Sout$$

$$n = INT(\log_2 X)$$

where Sout is an output image size, and Sin is the input image size, and is judged as the minimum number of layer/layers of hierarchy, and

wherein, in said encoding step, image data is encoded up to a hierarchy which satisfies a condition of

Number of Layer/Layers to Be Decoded = (Total Number of Layers) - n + 1.

91. (New) A decoding method of decoding encoded image data which has been hierarchically encoded in advance by a discrete wavelet transform method, comprising:

determining a size of an image to be outputted;

judging a minimum number of layer/layers of hierarchy needed to obtain a decoded image of size equal to or exceed the determined size;

determining whether the minimum number of layer/layers of hierarchy corresponds to all the layers of hierarchy of the encoded image data;

decoding, if the determination proves true, all the layers of hierarchy of the encoded image data, and otherwise decoding the encoded image data up to a layer of hierarchy which is one or more layers higher than the minimum number of layer/layers of hierarchy; and

reducing the size of the decoded image to the determined size,

wherein said encoding includes:

encoding a lowest layer of hierarchy of an image among layer/layers which has/have not been encoded, comparing a size of an encoded image and the determined size, and repeating encoding of a lowest layer of hierarchy of the image among the layer/layers which has/have not decoded when the size of the encoded image is smaller than the determined size; and

encoding a next lowest layer of hierarchy of the image when the size of the encoded image becomes not smaller than the determined size for a first time.